



TITLE:

Inter-university Upper atmosphere Global Observation NETwork (IUGONET) - Development of metadata database

AUTHOR(S):

HAYASHI, Hiroo; HORI, Tomoaki; KOYAMA, Yukinobu;
TANAKA, Yoshimasa; KAGITANI, Masato; KOUNO, Takahisa;
YOSHIDA, Daiki; ... NAKAMURA, Takuji; NOSE, Masahito;
SHINBORI, Atsuki

CITATION:

HAYASHI, Hiroo ...[et al]. Inter-university Upper atmosphere Global
Observation NETwork (IUGONET) - Development of metadata
database. 2010

ISSUE DATE:

2010-05-26

URL:

<http://hdl.handle.net/2433/126741>

RIGHT:

/ This is not the published version. Please cite only the published
version. この論文は出版社版ではありません。引用の際には出版社版を
ご確認ご利用ください。

IUGONET

Metadata DB for Upper Atmosphere

超高層大気長期変動の全球地上ネットワーク観測・研究
Inter-university Upper atmosphere Global Observation NETwork

PEM036-30

JPGU2010 2010.05.26 (Makuhari)

Inter-university Upper atmosphere Global Observation NETwork (IUGONET) - Development of metadata database -

**H. Hayashi¹, T. Hori⁵, Y. Koyama², Y. Tanaka⁶, M. Kagitani⁷,
T. Kouno⁵, D. Yoshida², S. UeNo³, N. Kaneda³, S. Abe⁴,
Y. Miyoshi⁵, M. Okada⁶, T. Nakamura⁶, M. Nosé², and A. Shinbori¹**

1. RISH, Kyoto Univ., 2. WDC/Kyoto, Kyoto Univ.,
3. Kwasan and Hida Observatories, Kyoto Univ.
4. SERC, Kyusyu Univ.,
5. STE Lab., Nagoya Univ., 6. NIPR,
7. PPARC, Tohoku Univ.



The IUGONET project - Objectives

Purposes of this 6-year (2009-2014) project are:

- to develop a metadata database (DB) of the upper atmosphere (UA) data by ground-based observation accumulated over 50 years since IGY by Japanese institutes/universities.
- to promote effective use of the observational data and comprehensive studies of the UA.
- to investigate mechanism of long-term variation in the UA

This project is supported by Special Educational Research Budget (Research Promotion), MEXT, Japan

Participating universities and research institutes

- Planetary Plasma and Atmospheric Research Center, Tohoku University
- National Institute of Polar Research
- Solar Terrestrial Environment Laboratory, Nagoya University
- Research Institute for Sustainable Humanosphere, Kyoto University
- World Data Center for Geomagnetism, Kyoto University
- Kwasan and Hida Observatories, Kyoto University
- Space Environment Research Center, Kyushu University



Project members

- **Tohoku Univ.**
T. Ono, N. Terada
M. Kagitani
 - **National Institute of Polar Research**
N. Sato, T. Nakamura,
H. Miyaoka, M. Okada,
Y. Tomikawa
Y. Tanaka
 - **Solar Terrestrial Environment Lab., Nagoya Univ.**
T. Ogino, Y. Miyoshi, Y. Otsuka
T. Hori, T. Kouno
 - **World Data Center, Kyoto Univ.**
T. Iyemori, M. Nosé
Y. Koyama, D. Yoshida
 - **Research Institute of Sustainable Humanosphere, Kyoto Univ.**
T. Tsuda
H. Hayashi (*), A. Shinbori
 - **Kwasan and Hida Observatory, Kyoto Univ.**
K. Shibata
S. UeNo, N. Kaneda
 - **SERC, Kyushu Univ.**
K. Yumoto
S. Abe
- Member of core development team**
(*) Lead of core development team

Observations by IUGONET institutions

Iceland
aurora imager x2
magnetometer x3

Toromso
IS radar (EISCAT)
meteor radar
MF radar

**MU radar
@Shigara
ki**

**SuperDARN
Hokkaido HF
radar**

Svalbard: IS radar
(EISCAT),
meteor radar, aurora imager

**Solar
observatory
(Kyoto Univ.)**

**Equatorial Atmospheric Radar
(EAR)**

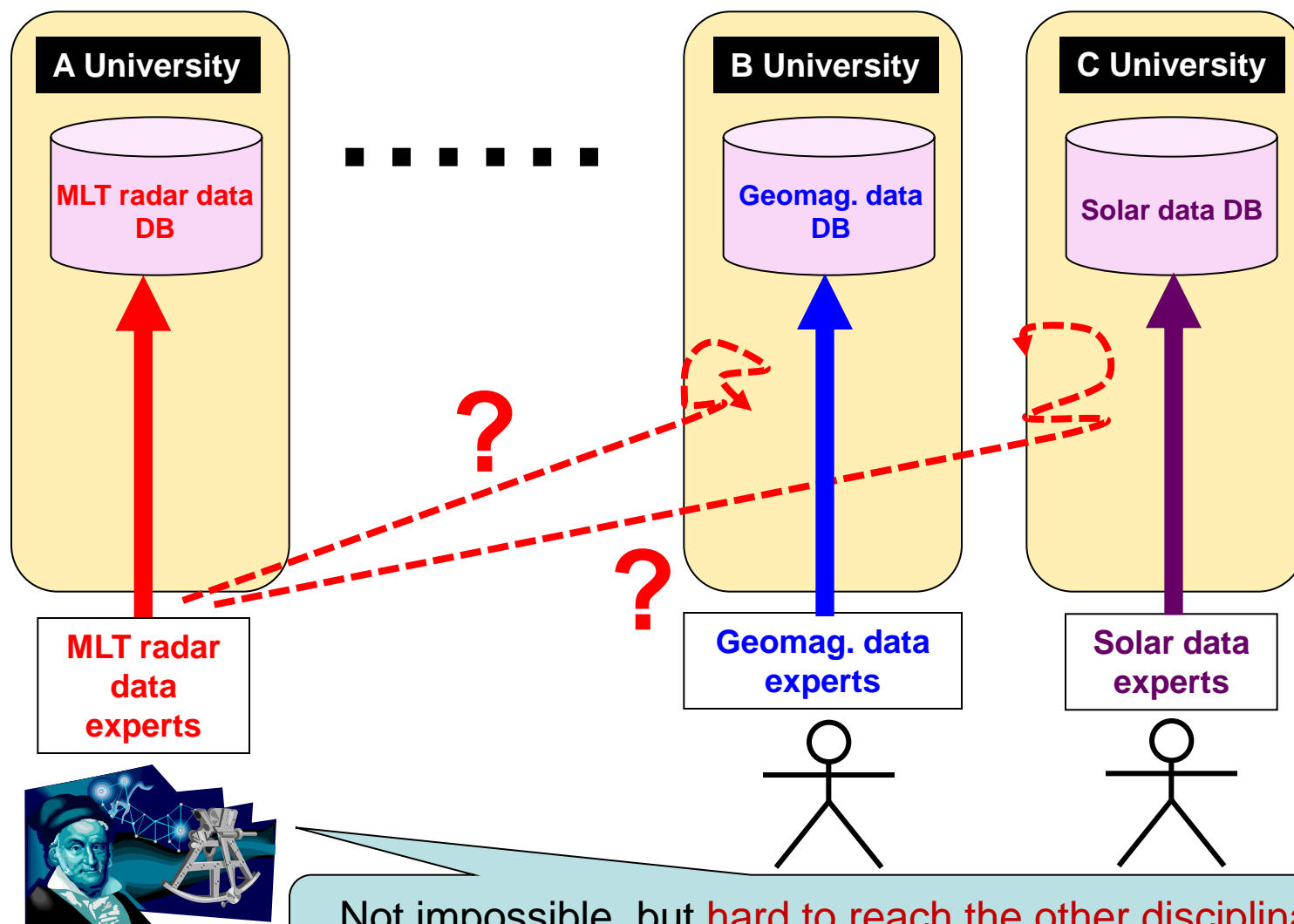
**litate, Onagawa
radio telescope
magnetomter**

SYOWA base
SuperDARN radar x2
MF radar
aurora imagers
magnetometer chain
ELF obs. (conjugate with
Onagawa)



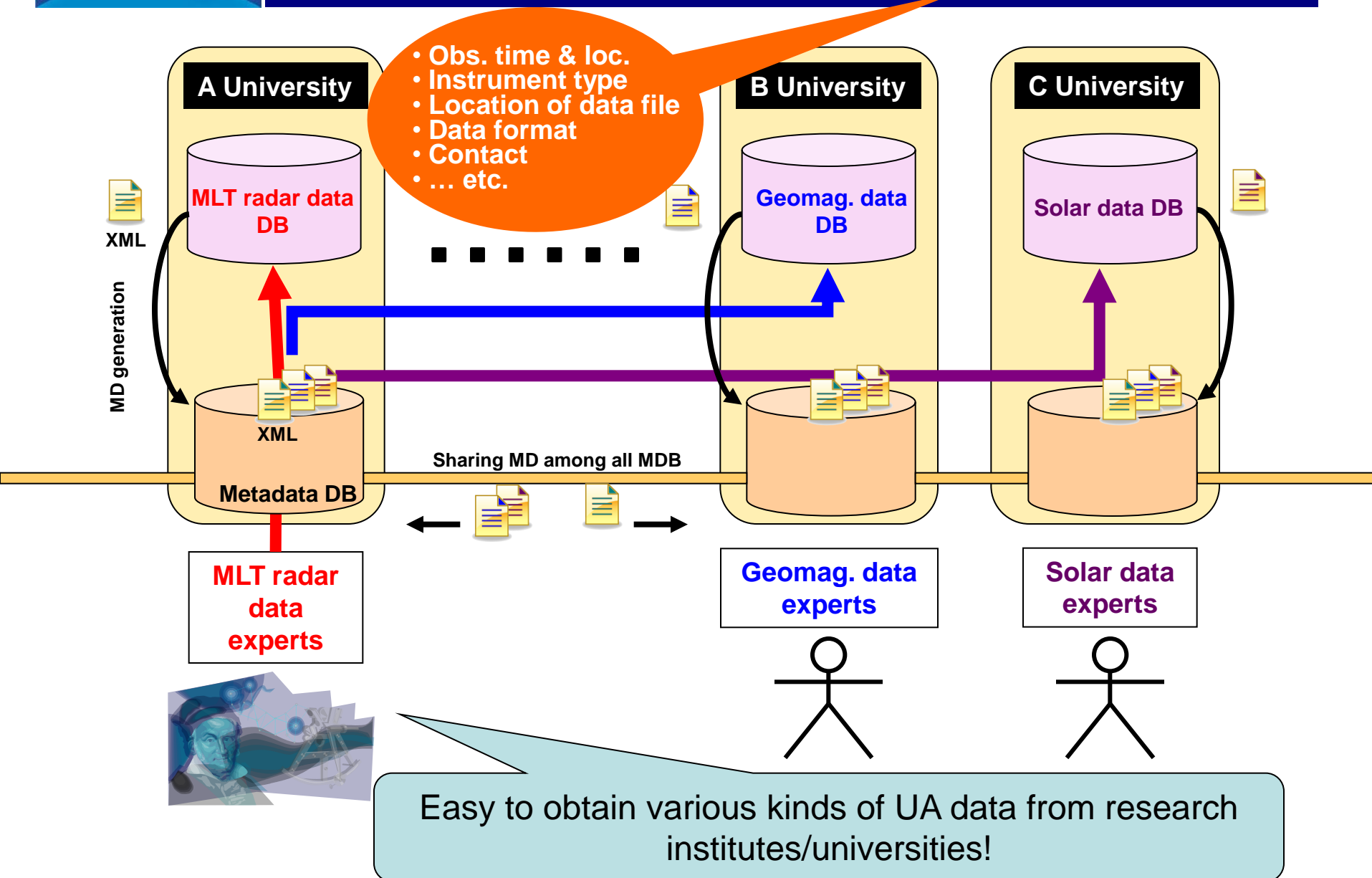
- MST radar
- ▲ MF / meteor radar
- ◆ MAGDAS magnetometer
- ★ FM-CW radar
- OMTI imager
- WDC magnetometer

Problem with databases

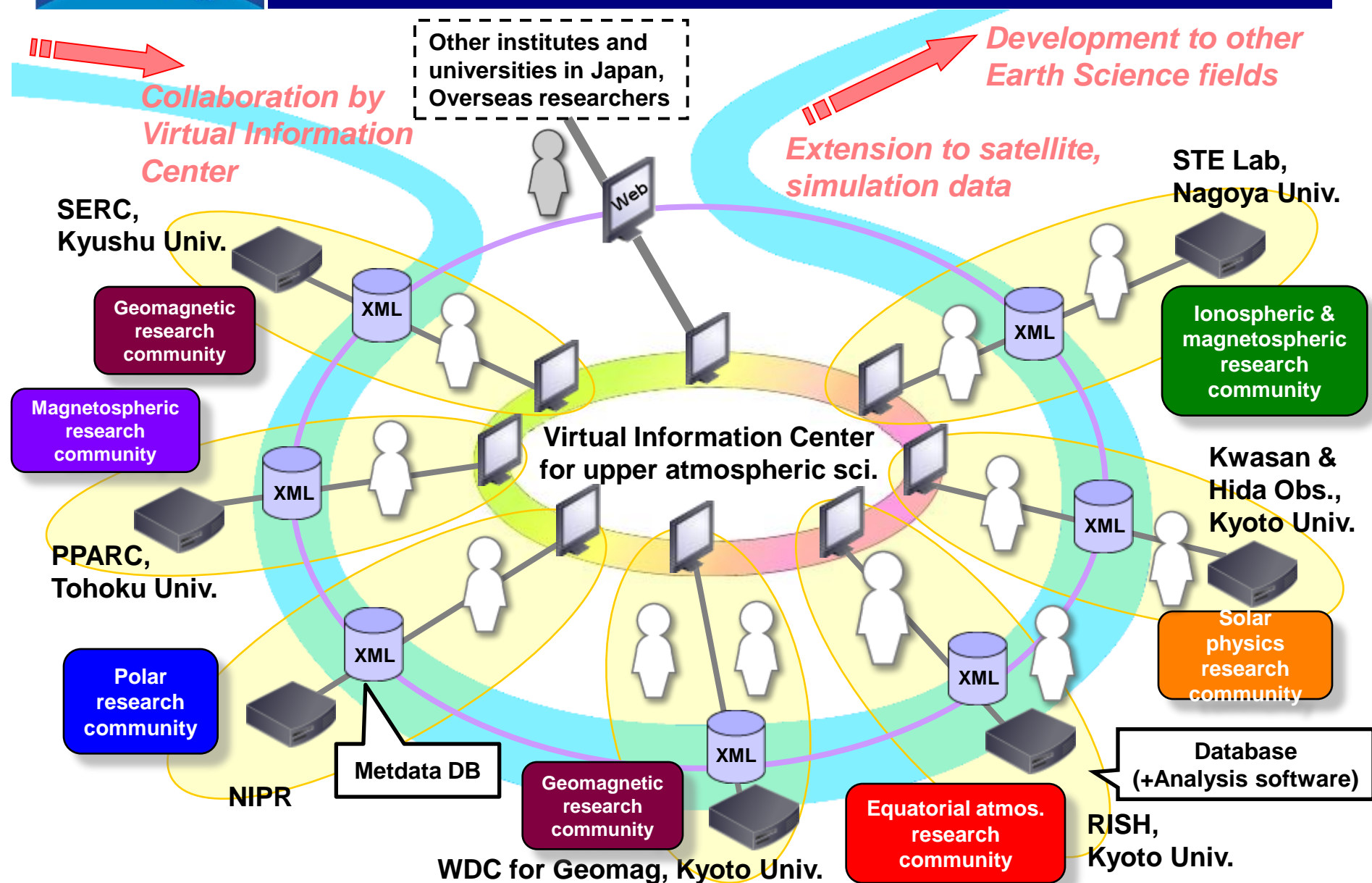


Not impossible, but **hard to reach the other disciplinary data!**

Database access through metadata DB



Project Schematic





Project Timeline

Task	Y2009	Y2010	Y2011	Y2012	Y2013	Y2014	Detail
Virtual information center (VIC) of UA studies	System installation 	Normal operation		System update			Construct the integrated research environment (TV-conference system, ..)
Development of metadata DB system	Prototype system devel. 	Regular system devel.	Open to public				Design and develop the metadata DB system
Design the Metadata format standards	Ver.1 format 	Update & document					Release the format ver.1 and keep updating if necessary
Development of data analysis software	Specifications and basic design 	Programming	Open to public				Develop and release analysis softwares for UA data
Maintenance&extension of existing DBs of Observation data		Maintenance of obs. DBs & exam. of non-digital dataset 		Effort focused on old data from Y2012 on			Incorporate non-DB'd data into the DBs
Metadata generation		Collecting metadata from each obs. DB 		Effort focused on old data from Y2012 on			Generate metadata in the designated format and add to metadata DB
Operation of metadata DB							Release the metadata DB for community
VIC extension to related fields							Wrap up the project and discuss further extension



Design of metadata format

IUGONET metadata format = SPASE + modifications

(<http://www.spase-group.org>)

SPASE Space Physics Archive Search and Extract
Space Physics Archive Search and Extract (SPASE) Consortium

Home
Steering Committee
Data Model Working Group
Technical Working Group
Tools and Services Consortium Members

Announcements:
SPASE face-to-face meeting (July 9-11, 2007) [more...](#) Have a question? [Ask SPASE](#)

The SPASE data system is a model for scientific data systems. It is based on the latest web-based technologies and is designed to be a distributed data systems with a heterogenous mix of platforms and systems.

Data Model Document
[History of changes](#)
[Current Version \(2.0.0\)](#)
Released: 2009-04-29
[Current Draft \(2.0.1\)](#)
updated: 2009-07-10
[All documents](#)

Services
[SMWVG Registry Search](#)
[Naming Authority Groups and Mailing Lists](#)

Data Dictionary
[Search](#)
[Tree](#)
[Explorer \(New!\)](#)
[XML Schema](#)
[XML Stylesheet](#)
[XML Templates](#)
[XMI Models](#)
[Ontologies](#)

These pages focus on the data model for the SPASE data system. The data model includes the structure of messages passed between systems; how to enrich data for interchange and archiving; and a data dictionary defining all terms and keywords used in the system. A full description of the data model is included under [Documents](#).

Also included are [examples](#) that implement the data model.

[Tools](#) to demonstrate the utility and capability of the SPASE metadata and framework

If you should have any questions or comments please [contact us](#).

News
[SPASE in the literature](#)
[Briefs](#)

SPASE

metadata format developed by international consortium to comprehensively describe research resources regarding heliospheric and magnetospheric satellite observations

- closely related to STP and upper atmosphere researches (→ easy to use as a base format)
- new metadata elements & words appendable (→ customizable according to our data)
- widely-used in VxOs (→ possible metadata exchange in the future)

IUGONET's modifications

- additional words to represent non-digital archives
- additional words to represent heliospheric coordinates
- new metadata elements to describe observation location & range



Development of MDB system

Prototype of MDB system is being developed by an existing repository software (**DSpace**).

- able to register, search, collect, and provide metadata
- able to handle arbitrary metadata formats
- free, and widely used (e.g. digital academic repositories)

Search Results

Search: Time from: to UTC

for

☒ NumericalData ☒ Catalog ☒ DisplayData ☒ Granule ☒ Repository ☒ Observatory ☒ Instrument ☒ Person

Results 1-10 of 35.

Results/Page | Sort items by In order

Item hits:

ResourceID	Resource Type	Description	Association
spase://nssdc/NumericalData/ISEE_00321	NumericalData	ISEE 2 FPE plasma ion parameters 1977-10-26T00:00:00-1980-04-08T00:00:00	-
spase://VHO/NumericalData/WIND/SWE/H5_PT12S	NumericalData	WIND/SWE Electron Quadrature Moments Parameters (12-15s rate) (New Mode) 2002-08-16T00:00:00Z	-
spase://VHO/NumericalData/Ulysses/MAGandPLS/PT1H	NumericalData	Ulysses hourly merged magnetic field and plasma data 1990-10-25T00:00:00-2008-10-	-

Metadata list

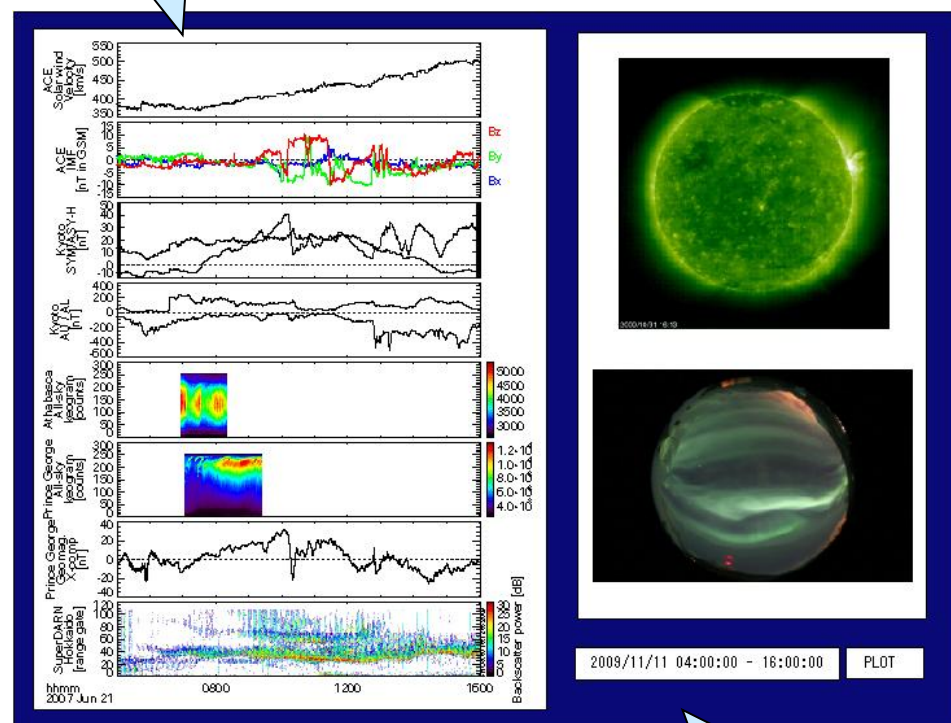


Development of analysis software

- Development of analysis and quick-look software for our observation data has just started, in collaboration with the ERG Science Center.
- The software will be produced with the THEMIS science Data Analysis (TDAS) IDL libraries and be functioned on the free IDL Virtual Machine.

multiple,
“stacked” plots

future image



GUI interface



Summary

- The “**IUGONET**” project will develop a **metadata DB** to facilitate efficient use of the upper atmospheric data, and thereby to promote comprehensive, multi-disciplinary studies.
- Current development status :
 - Metadata DB system is being developed on the basis of **DSpace**.
 - Metadata format has been determined - **SPASE** with some modifications.
 - Analysis software started to be developed with **TDAS IDL** libraries.
- The IUGONET metadata DB will surely contribute to the promotion of international interdisciplinary studies in the **CAWSES-II Escience and informatics group**.



More info about IUGONET

● IUGONET homepage

<http://www.iugonet.org/en>



● JpGU exhibition booth

